;login: The UNIX Newsletter

Volume 2, Number 7, August 1977

Minutes of the First National UNIX Users Group Meeting

Steven Zucker, ***Interactive Systems Corporation***

The First National Meeting of the UNIX User's Group was held at the University of Illinois, Urbana-Champaign Campus, on May 19–21, 1977. Steve Holmgren of the University's Center for Advanced Computation chaired the meeting. The enthusiasm of the more than 150 participants and the informal tone of the sessions resulted in a very stimulating atmosphere for the exchange of ideas. The meeting was divided into eight sessions:

- UNIX Site Activities
- UCLA Data Secure UNIX
- Interprocess Communications
- Graphics
- Languages
- Networking
- Data Base Management Systems
- Phototypesetting

My hope is that these notes on the sessions will be useful in directing those wishing more details to people who can provide them. I offer my apologies to those whose contributions I have inadvertently omitted and urge them to send their contributions to this Newsletter.

Many of the sessions were replete with announcements by speakers as well as members of the audience of new and/or improved drivers for one or another device, with the T1-16 Magnetic Tape Unit receiving the most attention. Rather than list all the drivers mentioned here, I would like to suggest that a column in the UNIX NEWSLETTER be devoted to information of this kind with installations or individuals willing to disseminate such code supplying information as to features and requirements.

UNIX Site Activities

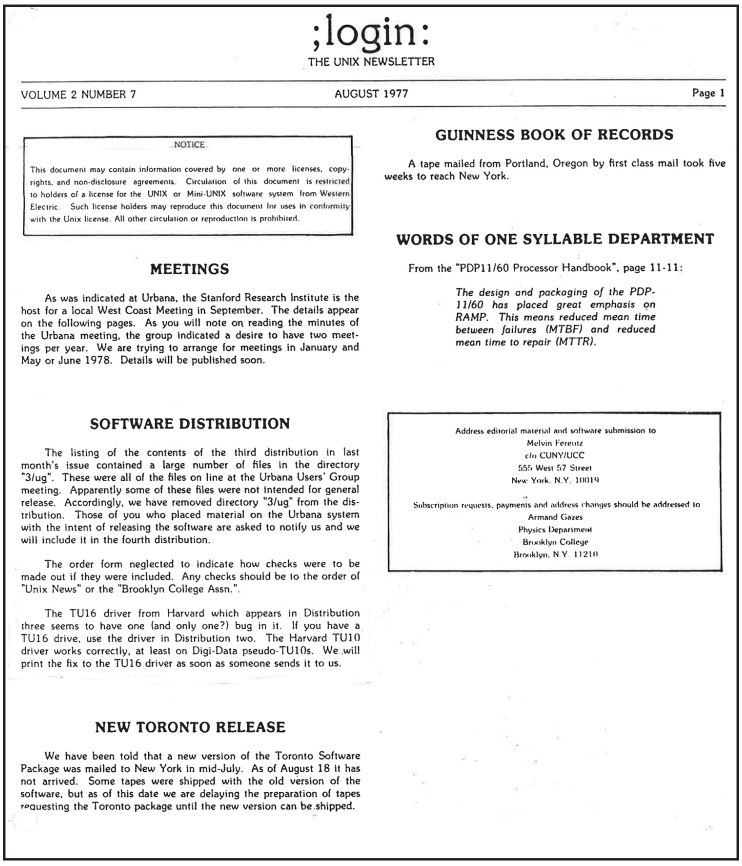
Heinz Lycklama, ***Bell Telephone Laboratories***

Heinz described the several variants of UNIX that have been or are being developed at Bell Labs. In addition to the standard UNIX system which Western Electric already licenses, there are three other systems in use at Bell Labs.

LSI UNIX (LSX): LSX occupies 8K words of main memory leaving up to 20K words of user space for the single user that it supports. Minimum memory requirements for running LSX are 20K words of main memory, the extended instruction set and two floppy disks. LSX is written in C and will run the C compiler. It runs at most three processes and supports the notion of contiguous files but pipes are not supported.

LSX will run on the 11/10, 11/20, 11/34, or 11/40 as well as the LSI 11.

MINI-UNIX: Mini-UNIX supports up to four users running up to 13 concurrent processes on an 11/40, 11/34, 11/20, or 11/10. It occupies 12K words of memory leaving up to 16K words for user programs. It uses no memory mapping and, therefore, provides no memory protection. It requires an RK05 or larger disk.



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MEETINGS

As was indicated at Urbana, the Stanford Research Institute is the host for a local West Coast Meeting in September. The details appear on the following pages. As you will note on reading the minutes of the Urbana meeting, the group indicated a desire to have two meetings per year. We are trying to arrange for meetings in January and May or June 1978. Details will be published soon.

SOFTWARE DISTRIBUTION

The listing of the contents of the third distribution in last month's issue contained a large number of files in the directory "3/ug". These were all of the files on line at the Urbana Users' Group meeting. Apparently some of these files were not intended for general release. Accordingly, we have removed directory "3/ug" from the distribution. Those of you who placed material on the Urbana system with the intent of releasing the software are asked to notify us and we will include it in the fourth distribution.

The order form neglected to indicate how checks were to be made out if they were included. Any checks should be to the order of "Unix News" or the "Brooklyn College Assn.".

The TU16 driver from Harvard which appears in Distribution three seems to have one (and only one?) bug in it. If you have a TU16 drive, use the driver in Distribution two. The Harvard TU10 driver works correctly, at least on Digi-Data pseudo-TU10s. We will print the fix to the TU16 driver as soon as someone sends it to us.

NEW TORONTO RELEASE

We have been told that a new version of the Toronto Software Package was mailed to New York in mid-July. As of August 18 it has not arrived. Some tapes were shipped with the old version of the software, but as of this date we are delaying the preparation of tapes requesting the Toronto package until the new version can be shipped.

GUINNESS BOOK OF RECORDS

A tape mailed from Portland, Oregon by first class mail took five weeks to reach New York.

WORDS OF ONE SYLLABLE DEPARTMENT

From the "PDP11/60 Processor Handbook", page 11-11:

The design and packaging of the PDP-11/60 has placed great emphasis on RAMP. This means reduced mean time between failures (MTBF) and reduced mean time to repair (MTTR).

Address editorial material and software submission to
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The second issue of *;login:* (formerly *UNIX News*) was published in August 1977 and included the minutes of the First National UNIX Users group meeting held May 19–21, 1977. Excerpts from that issue are reproduced here and on the following pages. We have also scanned the complete issue and made it available for download at www.usenix.org/login/dec15/login_aug77.pdf.

MERT (Multi-Environment Real-Time System): This system runs only on an 11/70 or 11/45 as it requires the separation of kernel and supervisor spaces. MERT supports a real-time supervisor which can lock processes in memory, perform preemptive scheduling or time-out scheduling. The communication facilities (events, messages, shared memory, and process ports) were described. File system support for MERT is embodied in independent processes which communicate with other levels via messages.

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Ken Thompson, *Bell Telephone Laboratories*

An effort is under way at Bell Labs to convert UNIX to run on the INTERDATA 8/32. The conversion is being treated primarily as a portability exercise. As part of the portability exercise a pseudo C has been developed which enforeces strict typing of variables.

A significant number of file system changes are being planned for Version 7 of UNIX. The changes would extend the allowable number of blocks in a file system from the present 2^{16} to 2^{24} blocks, thus, making it easier to use large disk files such as the RP04. The i-node size will be extended from the present 16 words to 32 words which will include space for 10 direct block pointers, one indirect block pointer, one double indirect pointer, and one triple indirect block pointer, allowing files to be as long as 2^{32} bytes. Users IDs will be extended to 16 bits and the STAT and the FSTAT system calls will hide the physical addresses. A long SEEK system call will replace the present SEEK and a TELL system call (the inverse of SEEK will be added). The SWITCHES call will be thrown away and the SLEEP call will be replaced by PAUSE and ALARM. Significant changes are also anticipated in the STTY and GTTY system calls. It is unlikely that the new system will be available before the beginning of 1978.

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UCLA's Data Secure UNIX

Jerry Popek, *University of California, Los Angeles*

Jerry Popek described work at UCLA in which a secure version of the UNIX operating system is being developed. The system architecture is based on a kernel architecture, with program verification methods being applied to that software.

The kernel is composed of an operating system nucleus, smaller and simpler than the UNIX kernel, which is responsible for all operational security. It provides a "capability machine" with a number of simple kernel calls. Each one provides a primitive operating system function, such as process invocation, swapping, I/O, etc. Above the kernel, running in supervisor mode, is a "UNIX interface" module, that is part of each user's process (a process has two address spaces). That module is respinsible for providing an interface to user code that is identical to UNIX, and either performs the function, or prepares kernel requests to accomplish them if security relevant.

The secure UNIX system Popek described is to be capable of supporting large numbers of processes, and running virtually all non-super-user code without any change. A prototype implementation has been delivered to the government, and they are in the process of letting a contract to build a production version of secure UNIX.

Popek also described the program verification procedures necessary to show that protection is enforced by the system in an uncircumventable way.

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R. M. Walden, *Western Electric*

Following the Data Secure UNIX presentation, Bob Walden announced that the Government and International Systems Division of Western Electric has established an organization to provide support for UNIX, initially to government users. The service will include consultation, installation and training, trouble shooting or problem solving assistance, improved documentation, and new feature development.

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Interprocess Communication

Alan Nemeth, Bolt Beranek & Newman

Alan Nemeth reported on a series of meetings held to discuss interprocess communication in UNIX. The immediate goals of the meetings was to standardize on one or more interprocess communication mechanisms to be supported in UNIX systems run by the Department of Defense.

Two such mechanisms have been tentatively adopted: the port mechanism developed at The Rand Corporation and events developed at the University of Illinois. The Rand port mechanism described in Rand Report, R-2064/2, *Interprocess Communication Extensions for the UNIX Operating System,* provides a mechanism very much like pipes except that they can be named and opened by readers unrelated to the creator of the port. Ports also support message-oriented (as opposed to stream-oriented) I/O. While ports are intended for transfers of large amount of data between unrelated processes, the Illinois event mechanism provides a more efficient path for small one or two word messages. Each process has associated with it one event queue. Processes, using primitives provided by the kernel, can send "events" to ther processes, read an event from its queue if one is there, or wait for an event to appear on its queue. At present the development of a suitable signalling mechanism to augment ports and events and provide process synchronization is a subject for further study.

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Following an open discussion of ports, events, and synchronization, there were two presentations of segment sharing mechanism that have been employed in UNIX systems. Heinz Lycklama of Bell Telephone Laboratories described the MERT interprocess communication facilities. MERT provides messges which are very similar to the Illinois events except that the messages may be somewhat longer—10 words instead of 2. The messages are employed in MERT for communication between the file manage process and the MERT kernel. In MERT the user is given the capability of manipulating memory segments. The user may have up to 32 segments—6 of which may be in his active address space.

Following Heinz's presentation, Steve Holmgren described the Illinois segment sharing mechanism by which processes may send segments to or receive segments from other processes.

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Graphics

A special meeting of those attendees interested in graphics under UNIX was held on the evening of May 19. Karl Kelly of the University of Illinois Center for Advanced Computation presided at the meeting. This was a very informal session at which each manufacturer of graphics hardware took its knocks. The main conclusion that could be drawn from this session was that there exists a very large and very active group doing graphics under UNIX on a tremendous variety of equipment. It is probably safe to say that there is a UNIX driver for most of the common commercially available graphics devices.

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Languages

Mike O'Brien, *University of Illinois*

Mike spoke very briefly about a new C compiler which supports long variables with initialization, structures, containing variables with byte fields, conditional compilation, structure initialization, and a new printf program.

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Steve Bunch, *University of Illinois*

Steve spoke about a C compiler for the Honeywell level 6 which is to be in the public domain.

At this point in the meeting there were a number of announcements made from the floor of various languages available under UNIX from various sources. In particular Commercial Union Leasing Corporation, New York City, apparently has a C to FORTRAN processor as well as FORTRAN IV PLUS running under UNIX. Reports have indicated that the Commercial Union FORTRAN IV PLUS is vastly better than UNIX FORTRAN and it is available for a license fee from Commercial Union.

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Tucker Taft, *Harvard University*

Tucker described ECL, an extensible language that is being run at Harvard. Documentation is available from the Harvard Science Center.

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Arthur Olson, *University of California, San Diego*

Arthur Olson announced that San Diego was running the 11/40 floating point under UNIX.

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Evelyn Walton, *University of California, Los Angeles*

Evelyn Walton made a brief presentation of the Pascal to C translator being used by the UCLA security kernel project. The purpose of the translator was to enable the production of code in Pascal for which an automatic verifier exists. No attempt was made to translate all of Pascal to C. Thus the translator does not support sets or nested procedures.

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Peter Weiner, *Interactive Systems Corporation*

At this point in the meeting, Peter Weiner of Interactive Systems Corporation solicited suggestions from the floor on areas of UNIX that needed improvement or extension. Several euch suggestions were forthcoming especially in the networking area.

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Networking

Jody Kravitz, *University of Illinois*
Steve Abraham, *University of California, Los Angeles*

The first networking presentation was made jointly by Jody Kravitz and Steve Abraham. They announced that there will be an official release of the UNIX ARPANET NCP (Network Control Program) combining changes made at the University of Illinois, at UCLA, and at Rand. The new release will be available in mid-summer from ILL-NTS.

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Ken Thompson, *Bell Laboratories*

Ken described an experimental UNIX networking facility he is working on at Bell Laboratories. An interesting feature of the network is a protocol which provides a "directory assistance" facility. A demon process on each host accepts calls for directory assistance and provides routing information based on the part of the network that it knows about. The call initiation protocol establishes a path between the nodes on the network from source to destination and the messages transmitted from the source to the destination all follow the same path.

Present plans call for the use of a new DEC device, the KMC-11, a small microprocessor, to provide support for the network.

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Brian Lucas, *National Bureau of Standards*

Brian Lucas discussed the ETHERNET. The ETHERNET provides a very high bandwidth yet low cost means of connecting machines that are within a single building or cluster of buildings. The network utilizes coaxial cables which support a one to two megabaud signalling rate. Adding a new host is as simple as connecting to the cable with a high impedance tap. Microprocessors between the host and the cable perform the actual signalling and detect and resolve conditions in which more than one host tries to signal simultaneously.

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Data Base Management Systems

John Hoskins, *Office of Institutional Research*

John Hoskins described the Yale University Registration System. The system manages ten years of Yale undergraduate student records. Each student record is a separate file and the system holds approximately 15,000 records of two to three thousand bytes each. The system has been very well received in the Registrar's office where personnel are trained in only 4 hours and become expert in the use of the system in only two weeks. The primary components of the system are the Text Editor, a program called the "fence" (which makes available an editable copy of a student's record and prevents simultaneous update) and a number of shell files for producing grade reports, class schedules, and other reports as required. Those involved with it—both developers and users—speak very highly of the convenience and economy of using UNIX—even when compared with other larger and more expensive operating systems and machines.

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Dan Giclan, *New York Telephone*

Dan Giclan reported on the development of an enhanced, production version of the INGRES system developed at Berkeley. The improved system is oriented towards production use rather than theoretical completeness. By vesting ownership of the data bases in the user rather than the system and by placing responsibility for avoiding the rare but potentially dangerous problem of concurrency (simultaneous update) the system is able to run ten times faster than the original Berkeley system.

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Bill Mayhew, *The Children's Museum*

Bill Mayhew described "The Information System," available for license [from the Children's Museum].

The Information System is distributed as a collection of routines that perform the standard database operations: add item, delete item, add descriptor to item, remove descriptor from item, locate descriptor, retrieve next item in inverted list, delete descriptor from dictionary, plus the AND, OR, and AND NOT hitlist boolean operators. Also supplied is a user interface implementing a simple query language and providing facilities for entering, updating, and retrieving textual data items.

The Information System can be applied to a wide range of information management problems. It has been successfully used to develop interactive maintenance systems for mailing lists, membership and contribution records, and group visit and educational program reservations, and is about to be used as the foundation for a service to match the educational resources of cultural organizations with the needs of teachers throughout the Commonwealth of Massachusetts.

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Phototypesetting

Joe Ossana, *Bell Laboratories*

The principal speaker at the Phototypesetting session was Joe Ossana. He announced a new phototypesetting package, typesetter V7, which is or soon will be available from Western Electric for a $3300 license fee. The new package combines NROFF and TROFF and is written in C. This results in TROFF being 50% larger and 20–30% slower than the earlier version. There have been a number of significant improvements in the package however. First TROFF font control and width calculations are now taken from files so it is relatively easy to use the package to drive other phototypesetters. Second, one can now specify artificial bolding which is performed by overstriking characters with a small offset. EQN the mathematics typesetting program now works with NROFF.

Also:

- Bell Labs is looking into other typesetters (an APS4 or APS5 typesetters, which sells for about $100,000). TROFF will easily drive it, although making use of the advanced features such as more fonts or sizes may be difficult.
- Bell Labs has a Tektronics 4014 TROFF simulator which, though slow, can show what a typeset page will look like.
- Measurements have indicated that NROFF hypenation is correct approximately 97-1/2% of the time.
- There is a new columnar cable builder

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Two other announcements were made at the Phototypesetting session.

Larry Smith, *Texas Student Publications*

Larry announced that the University of Texas at Austin Student Publications are running two PHOTON typesetters under UNIX.

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Gerry Barksdale, *Naval Postgraduate School*

Gerry announced the availability of fonts which can be printed on a VERSATEK printer.

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During a break in the Phototypesetting session, two awards were presented. The first was presented by Greg Chesson to Steve Holmgren for his work in organizing and chairing the conference. Steve was pleased to receive a stuffed pheasant for his mantlepiece. The second award was presented by Ken Thompson to Dennis Mumaugh of the Department of Defense for having the largest collection of UNIX users software in existence.

Anyone wishing to purchase an angry-looking rubber chicken should get in touch with Dennis.

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Users Group Business

Mel Ferentz, *City University of New York*

Mel announced that the UNIX Users Group will be incorporating as a nonprofit educational organization in order to obtain such benefits as favorable postage rates on its mailings. He also announced that the software distribution center will be moving from Chicago Circle to New York where the availability of greater machine resources will make it possible to speed the delivery of new distributions. The schedule for the next Users Group meeting was discussed; it will be published in the NEWSLETTER when fixed.

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